FSA Integration Partner

United States Department of Education

Federal Student Aid

117.4.1a EAI Monthly Performance Report I

Task Order #117

Deliverable # 117.4.1a

Version 1.1

January 30, 2004

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1 Introduction

1.1 Summary

The purpose of this report is to document the EAI Core Operations services performed in support of Task Order 117, EAI Release 4.0 during the period of December 16, 2003 through January 15, 2004.

Task Order 117 provides for operational support and maintenance of the EAI architecture and infrastructure. Additionally, EAI Core services enable business application teams to implement application interfaces built upon the existing EAI architecture.

The efforts of the Core Operations services are summarized in the following sections:

- ***Section 2:*** *Major Accomplishments* - Provides an overview of the major accomplishments of the EAI Team over the course of the reporting period.
- ***Section 3:*** *EAI Architecture Overview* - Provides an up-to-date view of the EAI Architecture as it evolves over the duration of the task order.
- ***Section 4:*** *Environments* - Provides an overview of the environment infrastructure supporting the EAI Release 4.0 development and testing efforts.
- ***Section 5****: EAI Architecture Availability* - Provides a summary of the EAI Production Architecture availability and major support events.
- ***Section 6*****:** *EAI Operations Support Summary* – Provides a summary of support pages, bad data file transfer issues, and adhoc support requests.
- ***Section 7***: *Infrastructure Change Requests, Upgrades, and Enhancements* – Provides a summary of the change requests, significant updates and enhancements to the EAI infrastructure.
- ***Section 8:*** *Test Summary* – Provides a summary of application EAI interface testing activities for the reporting period.
- ***Section 9:*** *Integrated Planning Summary* – Provides a high level summary of infrastructure planning and support for new initiatives and applications coming onto EAI.
- ***Appendix A****: EAI Issue Summary* - Documents the EAI Operations related issues that opened or closed during the reporting period.
- ***Appendix B:*** *EAI Architecture Availability Summary* – Documents the availability for the EAI Architecture components.
- ***Appendices C-D:*** *EAI Operations Metrics – December 16 2003 – January 15 2004*

- ***Appendix E:*** *EAI Software Installation Report*- Documents the current status of all installed software for all EAI environments.
- ***Appendix F:*** *EAI Core Release 4.0 Organization Chart* - Documents the organizational structure and the resources assigned to the release for this reporting period.
- ***Appendix G:*** *EAI Core Release 4.0 Contact List* – Provides contact information for the EAI team.
- ***Appendix H:*** *EAI Environment Diagrams* - Documents the detailed EAI Development, Test, and Production environments.
- ***Appendix I:*** *EAI Change Request Summary, December 16 2003 – January 15 2004* – Provides the summary and detailed information for all EAI Change Requests for the reporting period.
- ***Appendix J:*** *EAI Operations Support Schedule, December 16 2003 – January 15 2004* – The support instructions and schedules provided to the Virtual Data Center (VDC) for EAI Operations.

2 Major Accomplishments

The following list of accomplishments represents the major efforts and initiatives for this reporting period:

- COD 3.0
  - Updated Interface Control Documents (ICD) for CPS, NSLDS, FMS, and SAIG.
  - COD Transformation code was updated to handle Award Year 2004-2005 message classes and translate into the proper flat file layouts.
  - FMS Transformation code was updated based on the R3.0 requirement for the Gaps Debit Date/Transaction date.
  - Supporting COD R3.0 Product Test interfaces with weekly EAI code deployments.
  - Developed Schools Testing tool to facilitate testing of ISIR files submitted to COD. The tool allows testers to quickly and easily create test data.

- FAFSA 8.0 Performance Testing support
  - Successfully completed 24 performance test cycles of the updated FAFSA 8.0 application. This included monitoring the MQ infrastructure and tracking throughput and response time statistics for the duration of each test, as well as writing and executing back-end transaction load generation script for two of the cycles.

- Provided 24 hours–a-day operations support for EAI architecture. Performed issue tracking and resolution and responded to daily adhoc support requests. Compiled detailed operations support metrics. Detailed production operations information is contained in the *EAI Production Architecture Performance Report* deliverables (117.1.2a *EAI Production Architecture Performance Report I* – delivered January 27, 2003, 117.1.2b *EAI Production Architecture Performance Report II* delivered – May 9, 2003, 117.1.2c *EAI Production Architecture Performance Report III* delivered – November 15, 2003, 117.1.2d *EAI Production Architecture Performance Report IV* delivered – December 15, 2003) as well as in this document.

- EAI Evergreening / Hardware Refresh – Refer to ***Appendix E***- *EAI Software Installation Report* for additional detailed information.
  - Supported the VDC hardware refresh. Provided software installation and other server specifications. An effort is in progress to install, configure, test, and migrate the EAI affected servers.
  - Performed the installation, configuration, testing, and migration of the FAFSA and FAFSA Demo environments to the new refreshed servers.
  - MQSeries v5.3 upgrade for the EAI environments will be included as part of the planned VDC hardware refresh. Other EAI enabled application servers will be upgraded as those servers are refreshed. Refer to Section 7.2.1 Virtual Data Center Hardware Refresh for details and current planned dates.
  - MQSI software will be removed from the FSA Production environment as part of the pending hardware refresh effort. MQSI components will not be installed on the replacement servers.

- Created and distributed EAI Operations support schedule to VDC. Refer to ***Appendix J*** – *EAI Operations Support Schedule - December 16 2003 – January 15 2004* for detailed information.

- Delivered the following deliverables:
    - 117.3.4a EAI Operations Services Performance Report VI
        - Submitted 12/15
        - Pending approval
    - 117.1.2d EAI Production Architecture Performance Report IV
        - Submitted 12/15
        - Pending approval

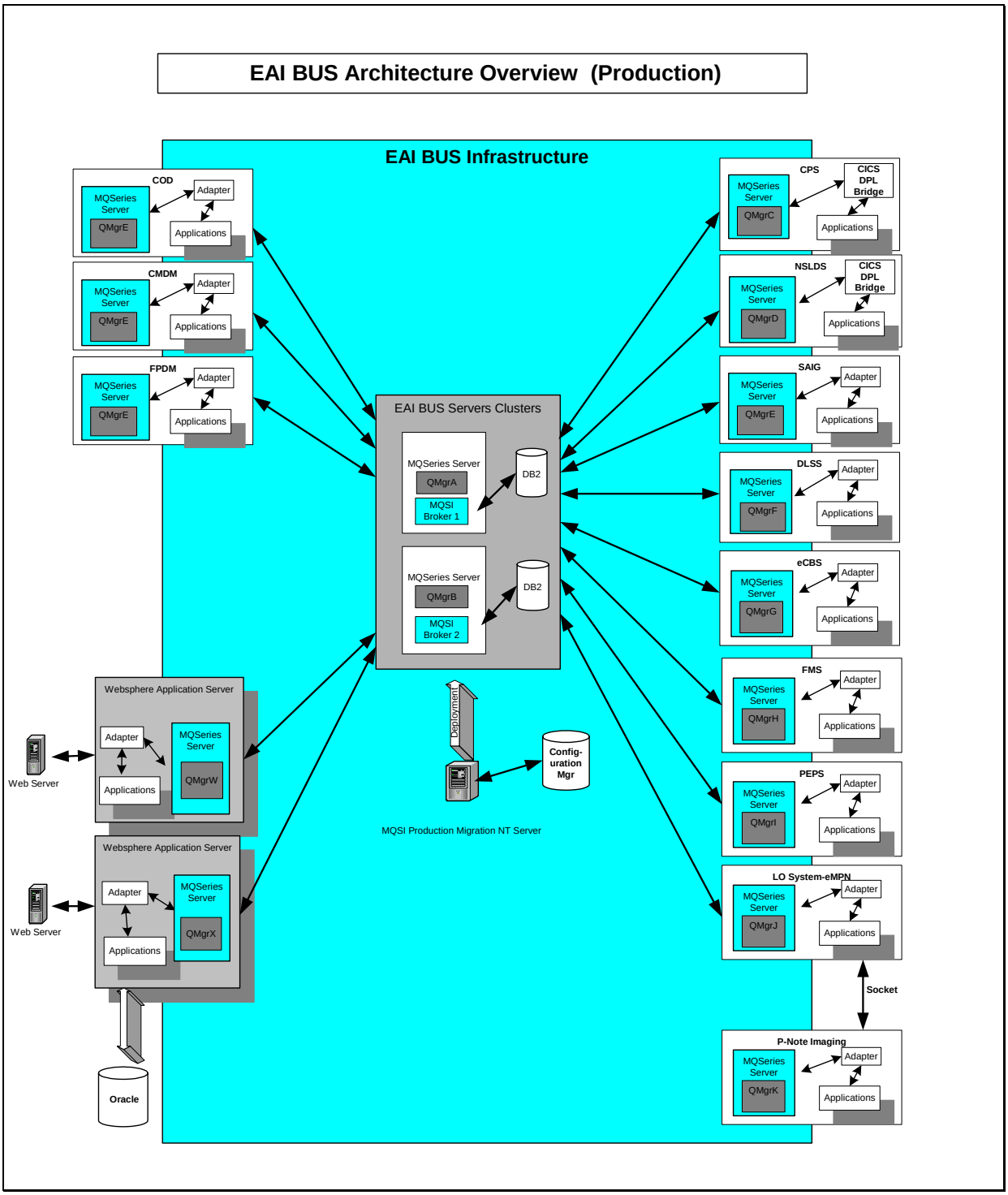
3 EAI Architecture Overview

The EAI Architecture is comprised of legacy systems, interfaces to the legacy systems, interfaces to modernization systems, and interfaces to FSA's Integrated Technical Architecture (ITA). No changes were made to the EAI architecture this reporting period.

The FSA Enterprise Application Integration Core Architecture includes the following five component areas:

- Legacy Systems – Mainframe and Mid-Tier
- Modernization Systems
- Internet – Websphere Application Server
- EAI Bus Servers
- EAI Development Workstations

The following diagram is a high level view of the EAI Architecture.


EAI BUS Architecture Overview (Production)
EAI BUS Infrastructure
COD
MQSeries Server
QMgrE
Adapter
Applications
CMDM
FPDM
EAI BUS Servers Clusters
MQSeries Server
QMgrA
MQSI Broker 1
DB2
QMgrB
MQSI Broker 2
Deployment
Config-uration Mgr
MQSI Production Migration NT Server
Websphere Application Server
QMgrW
QMgrX
Web Server
Oracle
CPS
CICS DPL Bridge
QMgrC
NSLDS
QMgrD
SAIG
QMgrE
DLSS
QMgrF
eCBS
QMgrG
FMS
QMgrH
PEPS
QMgrI
LO System-eMPN
QMgrJ
Socket
P-Note Imaging
QMgrK

4 Environments

This section provides detailed diagrams of the EAI environments, configurations, and interface connectivity to support all phases of the EAI System Design Life Cycle (SDLC). A critical component of Core Operations Services is the maintenance of all EAI environments in addition to Production. The following table represents the environments built previously to, but supported during this reporting period.

- Development
- System Integration Test (SIT)
- Inter System Test (IST)
- Product Test (formerly called UAT)
- Staging
- Production
- FAFSA EAI Development
- FAFSA Development
- FAFSA Demo Development
- FAFSA Test
- FAFSA Performance Test
- FAFSA Demo Production
- FAFSA Production

Refer to ***Appendix H*** – *EAI Environment Diagrams* for detailed diagrams of the current configuration of the above listed environments.

4.1 Environment Updates

4.1.1 COD 3.0 Product Test / IST

The EAI source code build was migrated to Product Test and IST to support COD 3.0 testing. The message transformation code was updated to translate the proper Award Year 2004-2005 message classes.

4.1.2 FAFSA 7.0

The FAFSA Performance Test server HPN3 has been replaced by the new HP server rp7410-3.

The FAFSA Demo Development server is now HPA2; it was formerly SU35E5.

FAFSA Demo Production now runs in the production environment, on HPN15 and HPN16.

Refer to ***Appendix H*** – *EAI Environment Diagrams, FAFSA-Production tab* for a diagram of the current configuration.

4.1.2.1 Development and Test

No changes since last reporting period.

Computing Environment	Server Manufacturer & Model	Queue Manager (Port)	Queue Manager Cluster	CPS Manager Cluster
EAI Dev	HPA2	FAFSAD2 (1420)	FAFSADC1	CPD1
FAFSA Development	HPA2	FAFSAD1 (1416)	FAFSADC1	CPD1
FAFSA Test	HPA2	FAFSAT1 (1417)	FAFSATC1	CPT1
FAFSA Performance	rp7410-3	FAFSAI1 (1414)	FAFSAIC1	CPA1
FAFSA Performance	HPN8	FAFSAI2 (1414)	FAFSAIC1	CPA1
FAFSA Demo Development	HPA2	FAFSAD3 (HPA2: 1417)	FAFSATC1	CPT1
FAFSA Demo Production	HPN15	FAFSAP2 (1414)	FAFSAPC1	CPP1
FAFSA Demo Production	HPN16	FAFSAP3 (1414)	FAFSAPC1	CPP1

4.1.2.2 Production

No changes since last reporting period.

Computing Environment	Server Manufacturer & Model	Queue Manager (Port)	Queue Manager Cluster	CPS Manager Cluster
FAFSA Production	HPN4	FAFSAP7 (1414)	FAFSAPC1	CPP1
FAFSA Production	HPN15	FAFSAP2 (1414)	FAFSAPC1	CPP1
FAFSA Production	HPN16	FAFSAP3 (1414)	FAFSAPC1	CPP1
FAFSA Production	HPN2	FAFSAP6 (1414)	FAFSAPC1	CPP1
FAFSA Production	HPN7	FAFSAP5 (1414)	FAFSAPC1	CPP1
FAFSA Production	rp-7410-1	FAFSAP1 (1414)	FAFSAPC1	CPP1

Additional information for FAFSA 7.0 can be found in the following FAFSA 7.0 Production Readiness Review documentation:

- FAFSA_7.0_Operations Checklist v3_12_20_02.doc
- FAFSA_7.0_TroubleShootingGuide_12-19-02.doc
- FAFSA_7.0 TechArchRequirements_v1.1_12-20-02.doc
- FAFSA 7.0 Performance Test_ver1.6_ 12-19-02.doc
- FAFSA_7.0_Install Guidelines (ITA) v1.2_12-20-02.doc

5 EAI Production Architecture Availability

The availability, or up time, of the EAI Production Architecture is a high level metric used to determine the overall health and stability of the architecture. The EAI Team works in conjunction with its data center counterparts to ensure the highest availability possible outside the normal, defined server maintenance windows.

5.1 Availability

The EAI Team operates with the informal availability target of 100%. This represents the ideal availability.

To provide a more accurate picture of the EAI Architecture availability, it is necessary to calculate the availability for each component (i.e., application interface, EAI server). The component availability, compared with a cumulative availability, provides a more accurate representation of availability and is the approach used for calculating this metric for the EAI architecture.

The key inputs for calculating the interface availability are based on:

- *FSA Server Maintenance Schedule*
- *Root Cause Analysis (RCA) documentation* - A RCA document is created for each major system event or outage and is the result of a System Restoration Team (SRT) being assembled by a Virtual Data Center (VDC) Availability manager in response to a Production outage or issue. Detailed information pertaining to each outage or issue is contained within each of these documents including total time of the outage or degradation of service.
- *VDC Operations Status Reports* – This report is published every business day by VDC Operations and covers all FSA servers and applications. It details any recent issues and outages and provides updates to prior issues as they are resolved. The report also references RCA documents when applicable.

5.1.1 Calculation

The architecture availability for each component is a simple calculation using the following variables:

$Total_H$ - Total Number of hours in Period
$Total_{MW}$ - Total Number of Scheduled Maintenance Window hours in Period
$Total_O$ - Total Number of Outage hours in Period

The calculation is as follows:

$$\frac{(Total_H - Total_{MW}) - Total_O}{(Total_H - Total_{MW})} * 100 = \% \text{ Availability}$$

To demonstrate the calculation, a sample interface availability is calculated for the period from September 27th through December 31st, with the cumulative, non-maintenance window outages equaling 5 hours.

E.g.

$$\frac{(2304 - 84) - 5}{(2304 - 84)} * 100 = 99.7 \% \text{ Availability}$$

The breakdown of each calculation for each variable:

- Total Number of hours ($Total_H$) in Period:

$Total_H$ = (Period End Date - Period Begin Date) * 24
= (12/31/02 - 9/27/02) * 24
= (96) * 24
$Total_H$ **= 2304 hours**

- Total Number of Scheduled Maintenance Window hours ($Total_{MW}$) in Period:

$Total_{MW}$ = Number of Sundays in Period * 6 hours
= 14 * 6
$Total_{MW}$ **= 84 hours**

- Total Number of Outage hours ($Total_O$) in Period:

$Total_O$ = Sum of all outage hours
$Total_O$ **= 5 hours**

5.1.2 Component Availability

The following table summarizes the EAI Production Architecture component availability.

Period = December 16, 2003 through January 15, 2004

$Total_H$ = 744 hours

Note: All application interfaces have a dependency on the EAI Bus and therefore any EAI Bus service outage impacts all components. The EAI Bus supports transport of transactional data and files between Trading Partner applications. The clustering of the EAI Bus servers allows fail over of all transactional data to the non-affected server. Due to software configuration constraints, file transfers are routed through either of the EAI Bus servers (SU35E3 or SU35E14). The Trading Partner application is configured to transfer files using either SU35E3 or SU35E14. There is no fail over to the other server in the event of a MQ Series outage. If a server experiences an outage, all Trading Partner file transfers configured for that affected server will be queued up until the issue is resolved. Once restored, the messages will be transferred normally. Therefore, the availability of all components will be affected for the length of the service outage for SU35E3 or SU35E14.

Refer to ***Appendix B*** – *EAI Architecture Availability Summary* for a detailed summary of the availability of the architecture components.

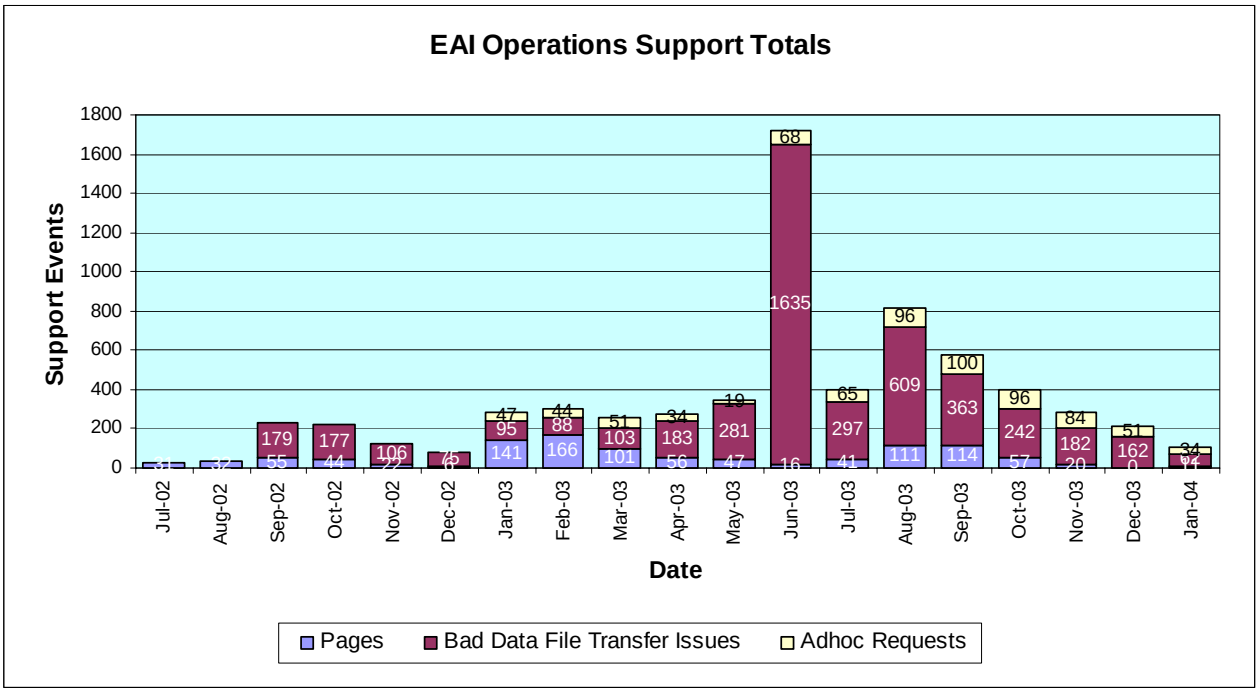
5.2 Major Production Events

Production events are defined as system affecting occurrences ranging in severity from Degradation of Service to a Service Outage. The tables in ***Appendix B*** – *EAI Architecture Availability Summary* summarize the major events encountered in the EAI Production architecture for this reporting period and are separated into events that are EAI related and non-EAI related. EAI related events are issues that have occurred in Production that are problems identified in the EAI architecture (i.e., MQSeries, Data Integrator). Non-EAI related events are issues that affect the EAI architecture, but where the EAI architecture is not the source of the issue (i.e., hardware failure, network outage, etc.). The information contained in these tables is used to calculate the availability metrics also found within ***Appendix B*** – *EAI Architecture Availability Summary.*

The 5.5 hours of Non-EAI related outage time are CPS-FAFSA related as shown in the spreadsheet.

6 Support Summary

The EAI team provides support that can be categorized into three general areas: Production support pages, bad data file transfer issues, and ad hoc support requests. The following table summarizes the metrics currently collected for the support pages, bad data file transfer issues, and adhoc requests.



6.1 Support Pages

The above chart summarizes the support pages for this reporting period. A higher number than usual appear in August and September, and this can be attributed to an EAI logging issue that caused frequent support pages during those months. This issue has since been resolved.

To provide greater insight to the areas of the architecture that have recurring errors or problems, we have implemented a mechanism to provide detailed MQ Series metrics. These metrics are based on the email alerts sent to the EAI Operations Support mailbox by the MQ Series monitoring software (MQMON). Refer to ***Appendices C-D*** – *EAI Operations Metrics– December 16 2003 – January 15 2004* for detailed metrics.

6.1.1 Pager Response Time

The EAI team transitioned Tier I support responsibility to VDC, and will no longer be paged directly for Tier I events. During the reporting period, the VDC escalated issues to the EAI team via phone conversations resulting in an immediate response time.

6.2 Bad Data File Transfer Issues

The bulk of the application interfaces consist of file transfers over Data Integrator. As expected, there are file transfer issues that occur. The most common causes for transfer issues arise in the SAIG to COD interface. Schools send files via SAIG to COD. Often the file formats and data are not correct and the file transfer fails. The EAI Team provides the research and analysis into the specific cause of the file transfer issue. Frequently the files are not in the correct format or layout. This root cause information is communicated to COD Customer Service so that the School can fix and resend the files. In addition the team provides support for file resend requests.

In the EAI Operations Support Totals diagram shown above, the number of transfer issues has stayed relatively stable over time, and the higher months were driven by the increase in overall SAIG volume. The large number of file transfer issues in June was due to two incidents of Data Integrator failure; one occurred on SAIG and the other at COD. Both happened during high traffic periods and caused a large number of transfer failures.

6.3 Adhoc Requests

The EAI Team provides support for adhoc requests. These requests vary in complexity from the simple status or configuration questions to creation of environments and extracurricular testing support.

In the above table, EAI Operations Support Totals, the number of adhoc requests has stayed relatively stable over time, and the higher months were driven by the increase in overall SAIG volume.

7 Infrastructure Change Requests, Upgrades, and Enhancements

One of the key objectives of EAI Core Operations Services is to provide infrastructure maintenance. This section provides a summary of the EAI submitted change requests and the significant updates and enhancements to the EAI infrastructure, including the reason for these enhancements.

7.1 Change Requests

The Change Request management process provides the structure to implement fixes, upgrades, or enhancements to the EAI environments. Change Requests are submitted, tracked, and implemented using a Rational ClearQuest tool called ECM Change Request Tracking Tool. Change Requests are logged either by the EAI Team or by members of the VDC staff. During this reporting period of FY2004, 17 Change Requests were logged affecting the Development, Test, and Production environments. Before submitting a Change Request to Production, the EAI Team thoroughly tests the change, which is subsequently packaged with instructions and/or other supporting documentation for implementation. Additionally, the EAI Team provides the VDC with implementation and post-implementation support and validation for the majority of the Change Requests.

Refer to ***Appendix I*** – *EAI Change Request Summary, December 16 2003 – January 15 2004* for a detailed summary of all change requests.

7.2 Upgrades

Upgrades or evergreening of the EAI infrastructure are being performed to continue vendor support and to obtain enhancements provided by new releases. For the purposes of this report, an upgrade is defined as a maintenance patch, release, or other fix that has been applied to the existing infrastructure (i.e., new software, new hardware). Detailed software upgrade information is contained in the *117.1.3 EAI Evergreening Schedule and Approach* deliverable.

No upgrades were performed during this reporting period.

Date	Software	Environment	Server(s)	Old Version	New Version	Reason

7.2.1 Virtual Data Center Hardware Refresh

The VDC is currently undergoing an effort to replace a subset of the existing FSA servers with updated servers. This includes migrating the affected Sun midrange servers to HP servers. An initial high level plan has been published which includes the dates in which the VDC plans to have all the replacement servers installed with the required software. The following table lists the servers and planned dates for all the affected servers in the EAI architecture. The information in the table is based on the published FSA Server Refresh Project 2003 dated January 7, 2004.

Computing Environment	Server (Host Name)	Planned Start Date	Planned End Date	Status
EAI Development	SU22E28	11/11/2003	12/31/2003	Complete
EAI Test (SIT,IST,UAT)	SU35E17	11/11/2003	12/31/2003	Complete
EAI Staging	SU22E25	1/12/2003	4/25/2004	In Progress
EAI Production	SU35E3,SU35E14	11/11/2003	2/29/2004	In Progress
FAFSA Performance	rp7410-3	9/28/2003	10/14/2003	Complete
FAFSA Demo Development	SU35E5	10/05/2003	11/10/2003	Complete
FAFSA Demo Production	SU35E9	10/16/2003	11/16/2003	Complete
FAFSA Demo Production	SU35E13	10/16/2003	11/16/2003	Complete
Informatica – Data Marts Production	SU35E18	11/10/2003	1/31/2004	In Progress
FMS/Oracle Production	HPV2	11/09/2003	3/28/2004	In Progress
FMS/Oracle Production Failover	HPV1	11/09/2003	3/28/2004	In Progress
PEPS Production	HPK2	10/03/2003	11/21/2003	Complete
FMS Development	HPL6,HPL7	11/11/2003	2/01/2004	In Progress

Included in the hardware refresh will be the upgrade of MQSeries v5.2 to WebSphere MQ (formerly MQSeries) v5.3 and the retirement of MQSeries Integrator (MQSI). MQSI will not be installed on the replacement servers.

7.3 Enhancements

The EAI team continually evaluates products that would improve the EAI infrastructure. For the purposes of this report, an enhancement is defined as new component that has been added to the existing infrastructure (i.e., new software, new hardware).

7.3.1 MQ Software QPasa!

No change in the status of the QPasa! implementation.

The VDC continues to have challenges implementing QPasa! on the mainframe and is working with the vendor to resolve. The VDC has not determined the final plan to retire MQMON.

Refer to ***Appendix E*** – *EAI Software Installation Report* for a list of all servers and environments where QPasa! is installed.

8 Test Summary

No application EAI interface testing was performed during the reporting period.

As a result, there is no appendix containing test documentation.

9 Integrated Planning Summary

No change to this section during this reporting period.

The EAI team is working with the Data Strategy and the Technology Strategy teams by meeting with them and reviewing their deliverables (123.1.9 Internal Data Strategy, 123.1.11 External Information Access (FSA Gateway) Strategy) to ensure that the strategies they develop leverage the EAI Architecture effectively. The EAI team also met with the Security team to discuss potential uses of EAI as component of the overall security solution.